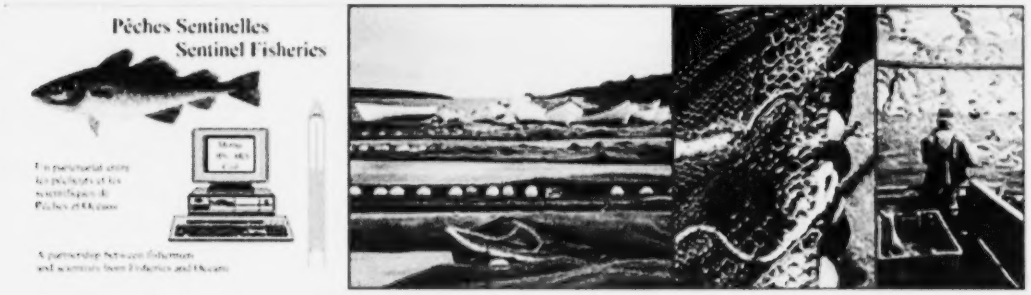

Preliminary Report on the July 2005 Mobile Sentinel Survey In the Northern Gulf of St. Lawrence

November 2005

Sentinel Fisheries Program

Each year, biologists from Fisheries and Oceans Canada assess the status of commercially exploited fish and invertebrate stocks. In order to perform these evaluations, scientists use data provided, in part, by mobile gear sentinel fishers (trawlers). The surveys performed by the mobile sentinel fishers cover almost the entire northern Gulf of St. Lawrence. Once analysed, the collected data are used to calculate abundance indices that are used to estimate the status of various stocks.

The mobile gear Sentinel Fisheries Program follows a depth-stratified random survey plan. The northern Gulf is divided into depth strata because depth is known to have an influence on the distribution of fish and invertebrate species. The following strata have been defined: 10-20, 20-50, 50-100, 100-150, 150-200 and over 200 fathoms (1 fathom = 1.829 metres = 6 feet). The mobile survey consists of 300 stations randomly selected within those strata. All strata are sampled because results from this survey are used for many species that have different depth preferences. It is also important to find the limits of distribution of a specie and to monitor any potential shifts in time . Nine trawlers, five from Newfoundland and four from Quebec perform the entire survey. At each predetermined station, the vessels perform a standard tow of 30 minutes duration at a speed of 2,5 knots. The nine boats participating in the survey use the same trawl, a 300 Star Balloon mounted on a Rock Hopper footgear. The trawl mesh size is 145 mm with a liner of 40 mm in the codend. The use of a liner allows the sampling of fish as young as age one but also requires the presence of observer aboard each vessel. The observers are from Biorex in Quebec and Seawacth in Newfoundland. In spite of the fact that all nine boats use the same trawl, a study showed a 25% variability in wing spread opening during trawling activities. The use of a restrictor cable allows to reduce this variability to 6 % and thus to compare the catches from all vessels.

The sentinel surveys require a great deal of thoroughness in collecting a variety of data. With the help of the crewmembers, the observers are responsible for the collection of numerous data according to a scientific protocol. At each set, the total catch is sorted by species and weighed. Then the length, weight sex and maturity of a number of fish of each species are recorded. For specific demands, some samples (otoliths, liver, gonads, stomach etc.) may also be taken on some fish. Moreover, freezing of fish samples is carried out for species at risk and biodiversity program. Finally, water temperature and fishing depth data are collected using a Vemco sensor installed on the trawl. These biological and oceanographic data yield valuable information on the size, growth, condition and diet of various species, as well as stock abundance and water temperature.

Catches not used for scientific purposes are sold to processing plants and the profits are used, in partiary finance the Sentinel Mobile Gear Program. The Department of Fisheries and Oceans (DFO) has primility responsibility for the administration of the program. The implementation of the program is the responsibi 4S of the Association des Capitaines-Propriétaires de la Gaspésie inc. (ACPG) for mobile gear fisheries in 4R and 4T Divisions, and of the Fish, Food and Allied Workers (FFAW) of Newfoundland in 3Pn and Divisions.

Between 1995 and 2002, two mobile surveys were carried out annually. These fishing activities, eauts lasting about two weeks, were conducted in July and October. Since 2003, due to rationalisation and c of 34% in the sentinel program budget, only the July survey is done every year.

July 2005 Survey

The 11th annual July sentinel survey was conducted in the northern Gulf of St. Lawrence betwe.e. July 1 and July 17, 2005. A total of 285 fishing stations were successfully carried out (Figure 1), ıse 21 in 3Pn, 129 in 4R (including 10 tows in the 10 to 20 fathoms strata), 105 in 4S and 30 in 4T. Tho 285 stations represent 95% of the sampling target.

- From July 6 to July 17, four Quebec trawlers covering 4ST completed 138 out of a planned 150 statio (Figure 1). On the west coast of Newfoundland (3Pn, 4R), from July 1 to July 8, five trawlers carried the entire 150 planned stations (Figure 1).
- The 30 tows in the 4T Division are conducted to complement the assessment of the Unit 1 redfish a **not** the Greenland halibut (turbot) stocks for the management unit 4RST. **The cod catches in 4T are used to estimate the abundance of the northern Gulf of St-Lawrence cod stock (3Pn, 4RS)** .
- Catches from the 10 tows carried out in the three coastal strata in 4R (10 - 20 fathoms) were used calculate an index of minimum trawlable biomass for cod. However, those strata having been survey only in the last three years (2003 to 2005), the treatment of this new index will be determined in t upcoming cod assessment in February 2006.
- Cod, redfish and turbot catches for the 285 successful tows of the 2005 July survey are presented. In table 1. This table also shows the total catches in cluding the unsuccessful and the discretionary tows in, 2005, the fish composing the main proportion of the other species category are black dogfish, capel herring, American plaice, white hake and Atlantic halibut .

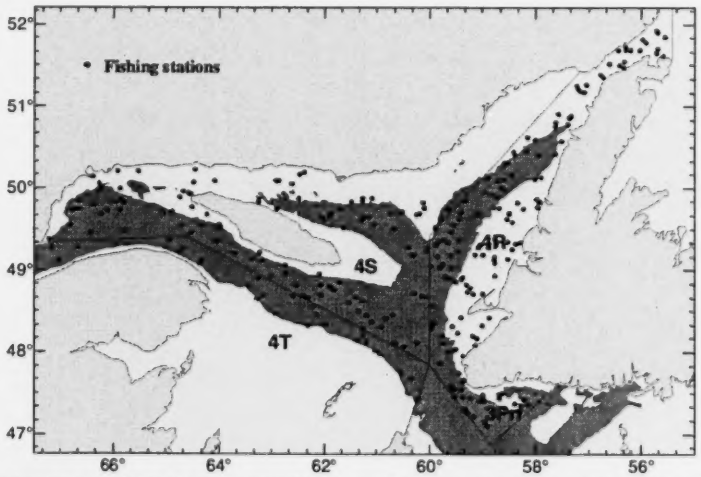

Figure 1: Map showing the distribution of stratified random tows performed during the July 2005 survey.

Table 1: Cod, redfish and turbot catches for the successful tows and total catches including unsuccessful and discretionary tows for the July 1995-2005 surveys (3Pn, 4RST).

	Sets		Survey Catches (kg)			Total Catches (kg)			
Year	Survey	Total	Cod	Redfish	Turbot	Cod	Redfish	Turbot	Other Species
1995	311	326	6 477	11 457	649	6 598	11 662	675	4 799
1996	272	332	7 254	16 921	1 300	12 108	27 169	1 502	8 743
1997	285	313	8 642	12 358	1 206	11 271	13 582	1 397	5 928
1998	289	320	7 719	16 154	1 472	12 196	36 231	1 668	7 311
1999	294	335	5 487	12 623	1 703	19 396	17 177	2 079	4 160
2000	291	324	7 893	7 574	1 583	16 963	10 486	1 932	5 580
2001	275	317	10 238	7 603	1 342	16 476	14 421	1 814	4 402
2002	261	293	7 729	8 101	1 486	18 551	8 849	3 090	4 315
2003	296	326	13 741	6 400	1 693	14 040	6 616	3 512	3 663
2004	280	317	14 072	8 245	2 015	15 655	13 295	2 567	6 941
2005	285	303	9 910	6 785	2 979	9 916	7 802	3 651	9 054

1. ***Biomass and Distribution of Groundfish***

Cod

The July sentinel survey series (1995-2005) suggest an increase in the minimum trawlable biomass index for cod between 1995 and 2000 with a rather stable period after. The preliminary data for 3Pn 4RS indicate a decrease of 14% in the minimum trawlable biomass index between 2004 and 2005 reaching 74,508 tonnes (Figure 2a).

The minimum trawlable biomass index shows a slight increase between 2004 and 2005 for the 3Pn and 4S Divisions. On the opposite, the 4R Division experienced a decrease with the minimum trawlable biomass dropping from 83,143 tonnes in 2004 to 69,108 tonnes in 2005.

Since 2003, three strata between 10 and 20 fathoms were included in the 4R Division. The minimum trawlable biomass for those three strata is the lowest of the short series going from 33,640 tonnes in 2003 to 10,000 tonnes in 2005 (Figure 2b). The estimate of total minimum trawlable biomass including the 10 to 20 fathoms strata also indicates a decrease of the total biomass between 2004 and 2005.

As in the past, the cod concentrations remain very low in Division 4S (Figure 3). Moreover, the amounts of cod as determined by the mobile sentinel surveys are much lower in 4S and 3Pn compared to 4R. The catch distribution of cod is located primarily in Division 4R along the west coast of Newfoundland (Figure 3).

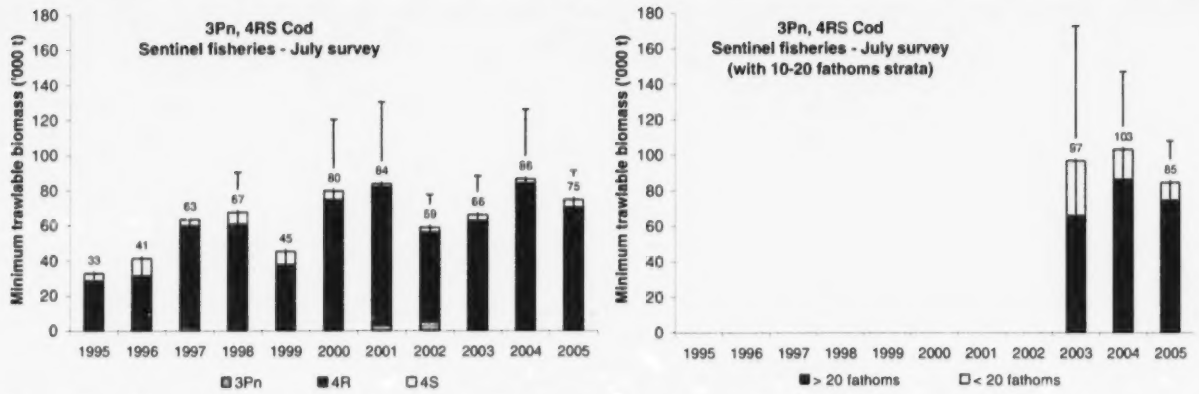

Figure 2: Minimum trawlable biomass index for cod based on the stratified random tows of the July sentinel mobile survey in 3Pn and 4RS Divisions (1995-2005). a) For strata in the 20 to more than 200 fathoms b) Including the three strata in 10-20 fathoms

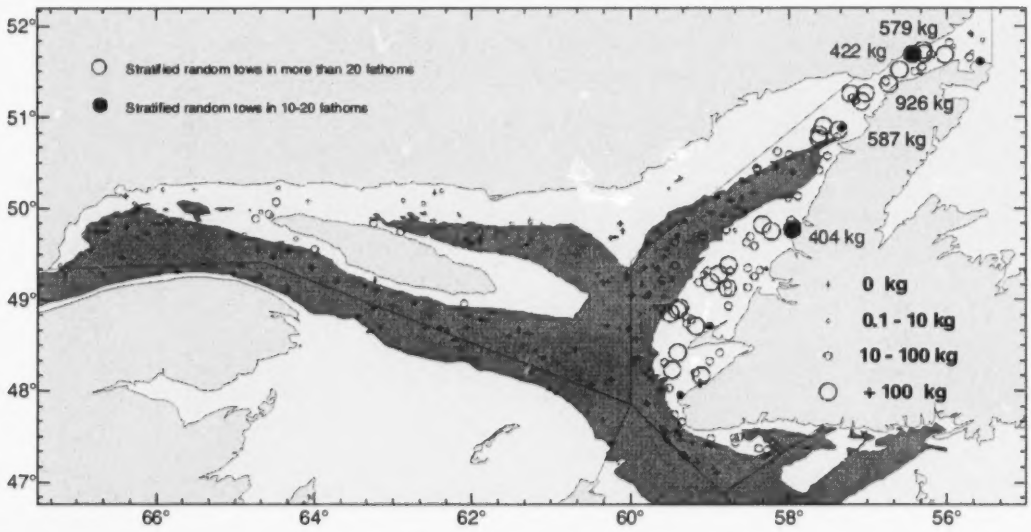

Figure 3: Map showing the observed catch distribution of cod from the July 2005 stratified random survey in 3Pn and 4RST Divisions.

Redfish

For the Unit 1 redfish stock (4RST Divisions), the July sentinel survey series (1995-2005) indicate a higher minimum biomass index between 1996 and 1999. In 2001, there is a decrease in the minimum trawlable biomass index with an estimate comparable to 1995. From 2001 on, the index is relatively stable and the estimate is of 56,086 tonnes in 2005 (figure 4).

As in earlier years, the redfish was concentrated for the most part in the channels of the Northern region of the Gulf (Figure 5). In July, good concentrations of redfish were found in the 3Pn subdivision. This area is not part of the redfish stock of Unit 1 management (4RST).

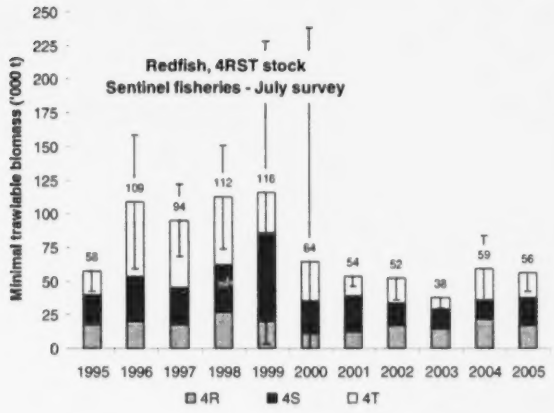

Figure 4: Minimum trawlable biomass index for redfish in 4RST based on the July stratified random survey (1995-2005).

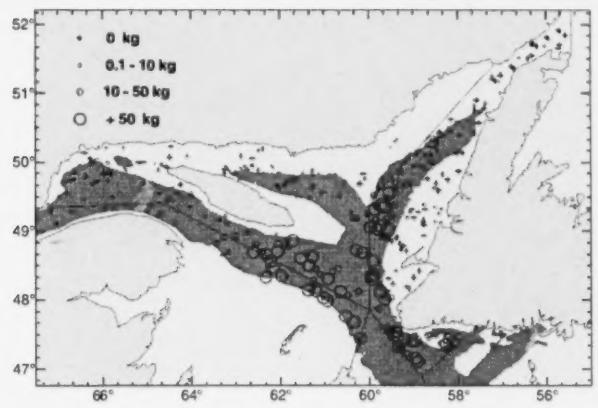

Figure 5: Map showing the observed catch distribution of redfish from the July 2005 stratified random survey in 3Pn and 4RST.

Greenland Halibut (turbot)

In 2005, the minimum trawlable biomass index for Greenland halibut reaches its highest levels with a total of 37,760 tonnes (Figure 6). The preliminary data show an increase of the estimate of minimum trawlable biomass index in each of the 4RST Divisions. One can observe an annual increase in the minimum trawlable biomass estimate of 14% for the period of 1995 to 2005.

The turbot was concentrated mostly in the Estuary and in the Laurentian Channel, around Anticosti Island and in the Northern portion of the Esquiman Channel (Figure 7). The distribution of Greenland halibut is overall similar to those of earlier years. The mobile sentinel survey does not sample the Estuary where turbot is found in abundance in the August DFO's annual scientific survey and in the commercial fishery.

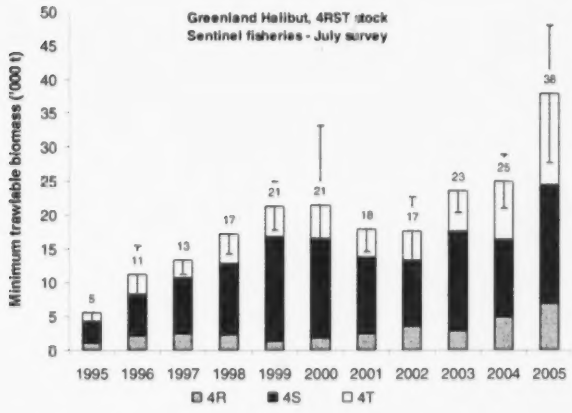

Figure 6: Minimum trawlable biomass index for Greenland halibut based on the July stratified random survey (1995-2005).

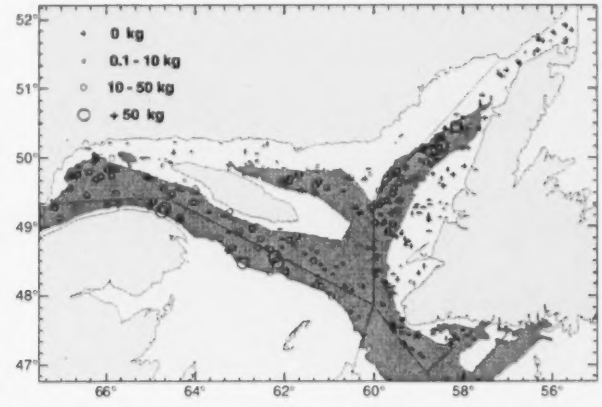

Figure 7: Map showing the observed catch distribution of Greenland halibut from the July 2005 stratified random survey in area 3Pn, 4RST.

2. Sampling and Analysis

The sampling of biological data (length, sex and weight) were completed for cod, redfish, Greenland halibut and Atlantic halibut.

Otoliths Otoliths were taken from cod in area 3Pn, 4RS. The otoliths were used to determine the age of individual specimens and these data will be included in the next cod stock assessment to be held in February 2006. Age is one of the key parameter in the study of fish population dynamics and in the evaluation of the abundance for the northern cod of St. Lawrence (3Pn, 4RS). The abundance is actually assessed with a model that has age-structured data as input. Such models allow a better follow up of the evolution of the stock dynamic.

Biodiversity and species at risk The main objective of this sampling is to obtain abundance data and biological measurements for the species which could be evaluated by the committee on the status of endangered wildlife in Canada (COSEWIC http://www.cosewic.gc.ca). When species from the priority list (92 species for the biodiversity and species at risk program) were captured, the length, the sex and the total weight were collected. When identification was doubtful, the individuals were frozen and brought back to the Maurice Lamontagne Institute to be identified.

Witch Flounder Witch flounder are typically found in deeper waters of the North Atlantic. The assessment of the resource relies on analyses based on length. The length frequencies per sex as well as the weight per length were collected for the assessment of the witch flounder. Douglas Swain of the Gulf Fisheries Center in Moncton (DFO) is the scientist responsible for the stock assessment on the witch flounder in the Gulf.

Herring and Capelin The July 2005 sentinel survey allowed the harvesting of whole specimens of herring and capelin. These frozen samples were brought back to the Maurice Lamontagne Institute for analyses which are completed by the team of François Grégoire, the scientist in charge of the stock assessment for these species in the estuary and in the Gulf of St-Lawrence.

for the July mobile survey

Addition of new fishing strata The three new strata between 10 and 20 fathoms, situated on the West coast of Newfoundland, were surveyed for a third year. The purpose of these new strata was to look at the presence of cod outside the zone previously sampled by trawlers in the July mobile gear sentinel survey. The three strata were created in 4R; one in the strait of Belle Isle, one north of the 49 th parallel and another south of the 49 th parallel. A total of 10 tows were done by four trawlers during the July 2005 survey (Figure 3). The cod catches varied between 0 and 422 kg for a 30-minutes standard tow. Half of the tows (5) reached the 30 minutes duration. The other 5 tows lasted less than 30 minutes either because of bad bottom (trawl hooked at the bottom) or because of the presence of fixed gears.

Acknowledgements

We wish to acknowledge the dedicated work of all the fishers, observers and coordinators who contributed in reaching the objectives of the 11 th annual July sentinel survey.

The following fishermen and observers contributed to the July 2005 sentinel survey:

4R, 3Pn			4S		
Skipper	Crew	Observer	Skipper	Crew	Observer
Winsor Hedderson (*Northern Tip*)	Derek Pittman Chad Hedderson Dwayne Decker	James Marsden	Jean-Pierre Élément (*Rémy Martin*)	Rémy Élément Martin Élément	Vincent Lemonde
Garfield Warren (*885-77*)	Leonard Warren Lester Hughes Enos Gaulton	Angus Fillier	Albert English (*Annie Annick*)	Richard Philibert Steeve Chouinard	Marie-Hélène Baril
Dereck Coles (*Catalina Venture*)	Robert Campbell Gorvin Williams Ashley Coles Randy Coles Abe Coles	Derek Poole	Marcel Roy (*Sextan*)	Gildas Cotton Jean-Guy Côté Yan Cotton	François Maturin
Murray Lavers (*Sylvia Lynn II*)	Floyd Biggin Warren House Barry Ryan	A.J. Felix	Réjean Bernatchez (*Chlorydon*)	Paul-René Côté Gilles Côté	André Rioux
Dan Genge Jr. (*NFLD Storm*)	Albert White Kevin Genge Genna Genge Claude Genge Jr.	Levi Harvey			

To know more :

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